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THE
Connecticut Agricultural Experiment Station.
NEW HAVEN, CONN.

BULLETIN No. 120

APRIL, 1895

Analyses of Fertilizers. Trade Values of
Fertilizer Ingredients for 1895.
Poultry Foods.

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
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NOTICE AS TO BULLETINS.

The Bulletins of this Station are mailed free to citizens of Connecticut who apply for them, and to others, as far as the limited editions permit.

Applications should be renewed annually before January 1st.


The matter of all the Bulletins of this Station, in so far as it is new and of permanent value, will be made part of the Annual Report.

 All Bulletins earlier than No. 71 and also Nos. 83, 93, 100, 101, 102, 106, 111 and 118, are exhausted and cannot be supplied.

NOTICE AS TO SUPPLY OF STATION REPORTS.

The Annual Report of this Station, printed at State expense, is by law limited to an edition of 12,000 copies, of which 5,000 copies are bound with the Annual Report of the Connecticut State Board of Agriculture, and distributed by the Secretary of the Board, T. S. Gold, West Cornwall, Conn.

After exchanging with other Experiment Stations and Agricultural Journals, the Reports remaining at the disposal of the Station will be sent to citizens of Connecticut who shall seasonably apply for them, and to others as long as the supply lasts.

 The Station has no supply of its Annual Reports for the years 1877, 1878, 1879, 1880, 1881, 1883, 1887, 1891, and 1893, but some of them may be obtained from Secretary T. S. Gold.

NOTICE REGARDING THE FERTILIZER LAW.

Persons who mix fertilizers, whether on a farm or in a factory, and sell these mixtures within the State of Connecticut, must, under the terms of the Fertilizer Law, pay analysis fees on such mixtures and meet the other legal requirements.

Purchasers may club together to buy fertilizers, making one person their agent for the purpose, or may pay one person for mixing and bagging goods which they severally own, without limitation by the law, but the sale of either fertilizer-chemicals, factory-mixed or home-mixed fertilizers within this State, subjects the seller to the requirements and penalties of the law.

TRADE-VALUES OF FERTILIZER INGREDIENTS IN RAW MATERIALS AND CHEMICALS, FOR 1895.

The following schedule for the valuation of fertilizers in 1895 has been adopted by the Massachusetts, Rhode Island, New Jersey and Connecticut Stations.

	Cts. per lb.
Nitrogen in ammonia salts (ammonic nitrogen)	18½
nitrates (nitric nitrogen)	15
Organic nitrogen of dry and fine ground fish, meat and blood...	16½
of cotton seed meal	12
of fine bone and tankage	16
of fine-medium bone and tankage	14
of medium bone and tankage	11
of coarse bone and tankage	5
of hair, horn shavings and coarse fish scrap...	5
Phosphoric acid, water-soluble	6½
citrate-soluble*	6
of dry fine ground fish, bone and tankage	5½
of fine-medium bone and tankage	4½
of medium bone and tankage	3
of coarse bone and tankage	2
of cotton seed meal, and wood-ashes	5
of mixed fertilizers, insoluble in both water and ammonium citrate	2
Potash as high-grade sulphate and in forms free from muriate (or chlorides)	5¼
as muriate	4½

In Mixed Fertilizers, *organic nitrogen* is reckoned at 16½ cents per pound, the price of nitrogen in raw materials of the best quality; *insoluble phosphoric acid* is reckoned at 2 cents: *potash* is rated at 4½ cents, if sufficient chlorine be present in the fertilizer to combine with it to make muriate; if there is more potash present than will combine with the chlorine, then this excess of potash is reckoned at 5¼ cents per pound.

* Dissolved from 2 grams of the unground phosphate previously extracted with pure water, by 100 c. c. neutral solution of ammonium citrate, sp. gr. 1.09, in 30 minutes, at 65° C., with agitation once in five minutes. Commonly called "reverted" or "backgone" Phosphoric Acid.

ANALYSES OF FERTILIZERS.

REPORTED BY E. H. JENKINS.

On the following pages will be found analyses of most of the fertilizers which have been examined at this station since making up the Annual Report for 1894.

These fertilizers are raw materials, such as are used by manufacturers or for home-mixing, or are applied to land unmixed. All the analyses here given were made by Messrs. Winton and Ogden, chemists of the Station.

NITRATE OF SODA.

4489. Sold by National Fertilizer Co. Bridgeport. Sent by T. J. Stroud, Shaker Station.

4511. Sold by National Fertilizer Co. Bridgeport. Sent by S. E. Curtiss, Stratford.

These samples contain 16.24 and 16.37 per cent. of nitrogen respectively. The regular retail price was \$50.00 per ton. At this price the nitrogen cost **15.4** and **15.2** cents per pound respectively, which is a little less than the average cost in this State, because the two samples contained more nitrogen than is usually found in this article.

DRY FISH.

4548. Sold by L. Sanderson, New Haven. From a lot bought by the Station for experiment.

4514. Sold by G. W. Miles, Milford. Sent by W. L. and S. T. Merwin, Milford.

ANALYSIS.

	4548	4514
Nitrogen as ammonia.....	.16	.80
organic.....	9.35	6.83
Soluble phosphoric acid.....	.51	.88
Reverted " ".....	5.70	8.35
Insoluble " ".....	1.08	1.82
Cost per ton.....	\$33.00	30.00
Valuation per ton.....	\$38.75	33.17
Nitrogen costs cents per pound.....	13.5	14.6

The per cent. of nitrogen in the sample of fish from L. Sanderson, **4548**, is exceptionally high. Eight per cent. is the average amount. With 8 per cent. of nitrogen the cost per pound of nitrogen would have been about 16 cents.

DRIED BLOOD.

4544. Sold by L. Sanderson. Sample from lot sold to this Station for experiment.

It contained 13.40 per cent. of nitrogen and 1.54 of phosphoric acid. Allowing 5 cents per pound for phosphoric acid the nitrogen costs **14.4** cents per pound.

COTTON SEED MEAL.

On the next page are given the analyses of Cotton Seed Meal recently made at this Station.

For "valuation" of cotton seed meal the pound of nitrogen is reckoned at 12 cents, of phosphoric acid at 5 cents and of potash at $5\frac{1}{4}$ cents. Since phosphoric acid and potash are present in small proportion it is not needful to determine their exact amount in every sample, but the valuation is made sufficiently exact by using the average quantities in which they occur.

The retail cost of organic nitrogen in 12 lots of meal has ranged from 9.9 cents to 13.4 cents per pound or on the average 11.9 cents.

The price of cotton seed meal is this year lower than ever, and there is nothing which supplies available organic nitrogen for fertilizers so cheaply. This material has long been used on tobacco with success and is now employed extensively as a fertilizer for other crops.

There is in some quarters a belief that the nitrogen of cotton seed meal is not as readily available as that from animal matter, fish, tankage, bone, etc.

Our knowledge regarding the relative availability of the various forms of organic nitrogen is scanty, but there are facts which indicate that cotton seed meal, castor pomace, linseed meal and the like, are equal if not superior to many forms of animal matter as sources of nitrogen for crops.

Thus cotton seed meal or castor pomace is used exclusively by many of the most successful tobacco growers as a nitrogen supply for tobacco, a crop which makes large demands on the soil-nitrogen and, occupying the land less than three months, requires plant

COTTON SEED MEAL.

Station No.	Sold by	Sent by	Per cent. of			Dollars per ton.		Cents per lb.
			Nitro-gen.	Phos-phoric Acid.	Potash.	Cost.	Valuation.	
4480	J. M. Williams, Manchester	W. H. Olcott, S. Manchester	6.87	3.15	2.01	\$23.00	\$21.75	12.9
4481	A. E. Arnold, Warehouse Point	W. W. Thompson, Warehouse Point	7.90	2.06	1.73	23.00	22.84	12.1
4494	-----	Judge S. O. Griswold, Windsor	7.21	-----	-----	-----	-----	-----
4495	R. A. Parker, Warehouse Point	W. W. Thompson, Warehouse Point	7.28	2.81*	1.85*	22.50	22.22	12.2
4497	-----	S. E. Curtiss, Stratford	6.56	2.81*	1.85*	21.00	20.49	12.4
4502	Olds & Whipple, Hartford	G. S. Phelps, Warehouse Point	6.79	2.81*	1.85*	23.00	21.04	13.4
4503	H. K. Branard, Thompsonville	E. M. Barnes, Thompsonville	7.08	2.81*	1.85*	20.50	21.74	11.1
4508	Bought in New York	S. D. Woodruff & Sons, Orange	8.32	2.42	1.69	18.50	24.17	8.6
4509	-----	S. E. Curtiss, Stratford	6.96	2.81*	1.85*	21.00	21.45	11.7
4522	Olds & Whipple, Hartford	H. V. Griffin, East Granby	6.96	2.81*	1.85*	22.00	21.45	12.4
4550	C. M. Cox & Co., Boston, Mass.	C. J. Dewey, Buckland	7.20	2.81*	1.85*	19.00	22.03	9.9
4569	F. L. Worthy & Co., Mittleague, Mass.	D. L. Brockett, Suffield	7.70	2.81*	1.85*	21.25	23.23	10.7
4570	F. L. Worthy & Co., Mittleague, Mass.	D. L. Brockett, Suffield	6.55	2.81*	1.85*	20.00	20.47	12.0
4583	Olds & Whipple, Hartford	W. S. Pinney, Suffield	6.38	2.81*	1.85*	19.00	20.06	12.0

* Average derived from large numbers of analyses.

food in quickly available forms. Were the nitrogen of cotton seed meal not quickly available it could hardly meet the needs of this crop. The fact, however, that tobacco growers use quantities of meal presumably much in excess of the crop requirements, somewhat weakens the argument.

In the Eighteenth Report of this Station, pp. 99, 100, are given the results of three years' exact experiments made by Wagner on small plots of soil, in which he tested the relative value of various forms of organic nitrogen on a rotation consisting of summer rye, flax, summer wheat and carrots. Castor pomace was thus compared with nitrate of soda, dried blood, fish, steamed bone and other materials.

If the availability of the nitrogen of nitrate of soda is called 100 then *in the first year* the relative availability of the nitrogen of blood was 67, of castor pomace 62, while that of fish and bone meal was 51 and 42 respectively.

The average of two years tests on the same soil was 67 and 65 for blood and castor pomace, 59 and 53 for fish and bone meal.

The average of three years tests on the same soil was 69 and 67 for blood and castor pomace, 64 and 61 for fish and bone. Experiments in pots gave results not essentially different from these.

Experiments of the same kind made at this Station in 1894, 18th Report, p. 96, in which corn was grown in pots with the different fertilizers showed "that under the conditions of this experiment, of the organic forms of nitrogen, castor pomace B was the most available, 85 per cent., when nitrate of soda equals 100 per cent. Somewhat less available was the nitrogen of linseed meal, 80, and of blood, 77 per cent. Next came cotton seed meal, 76, castor pomace A, 74, and horn and hoof 72 per cent. Last came dry fish, 70, and taukage 68 per cent."

These exact experiments indicate that the nitrogen of vegetable matters like those named, is as readily available to crops as that of most forms of animal matter. Even if the vegetable nitrogen were somewhat inferior, the lower price might still make it the more economical to use.

Farmers should specify in ordering, *bright, hulled or decorticated meal*, with not less than 6.6 per cent. of nitrogen. The low-priced, dark, unhulled meal which contains between three and four per cent. of nitrogen is uneconomical to use at current market rates. The nitrogen of the hulls (cortex) is comparatively worthless.

Castor pomace should be mentioned among the sources of organic nitrogen. No samples have yet been analyzed during the present season. It is bought chiefly in the tobacco growing districts and its use will probably not extend to other sections while the prices of nitrogenous matters hold as they are now.

DISSOLVED ROCK PHOSPHATE.

4490. Sold by National Fertilizer Co., Bridgeport. Sent by T. J. Stroud, Shaker Station.

4493. Sold by Liebig Mfg. Co., Cartaret, N. J. Sent by J. H. Webb, Hamden.

4507. Sold by Liebig Mfg. Co., Carteret, N. J. Sent by S. D. Woodruff & Sons, Orange.

4513. Sold by National Fertilizer Co., Bridgeport. Sent by S. E. Curtiss, Stratford.

ANALYSES.

	4490	4493	4507	4513
Soluble Phosphoric Acid	12.83	13.00	8.58	8.35
Reverted " "	2.93	2.92	6.34	6.85
Insoluble " "	1.15	.15	1.47	2.01
Cost per ton	\$18.00			18.00*
Available Phosphoric Acid costs	5.5			5.6

The sales of **4493** and **4507** were in car lots for spot cash and the price paid made the cost of available phosphoric acid less than three cents per pound.

Available phosphoric acid can be bought in dissolved rock phosphate very considerably cheaper than in dissolved bone black, which has hitherto been almost the only source of soluble phosphoric acid for those who mix their own fertilizers.

Dissolved rock phosphate has been chiefly used hitherto by manufacturers of mixed fertilizers, and two objections have been urged against its use for home-mixtures.

It has been claimed, in the first place, that the phosphoric acid of dissolved rock is not as available to crops as that of the more expensive dissolved bone black. This claim is absolutely without foundation. Ground rock phosphate is usually extremely slow in its action on crops. The same is true of waste bone black, as it is of bone ash. But when phosphoric acid has been brought into

* Regular retail rate.

solution in water, this soluble phosphoric acid is, in general, of the same value whatever the source from which it came.

In the second place, dissolved rock phosphate is likely to cake or set when stored for some time and hence to require screening or milling before it can be used. If it is mixed with a large proportion of muriate or sulphate of potash or nitrate of soda, it will sometimes cake together even harder than when unmixed.

If, however, enough animal or vegetable matter is present no such inconvenience need be feared.

To illustrate: Mr. J. N. Barnes, of Yalesville, made two mixtures in the spring of 1894. One contained 1200 pounds of tank-age, 300 of dissolved rock phosphate, 350 of nitrate of soda, and 150 of muriate of potash.

The other consisted of 100 pounds of fine bone, 600 of nitrate of soda, 325 of muriate of potash and 975 of dissolved rock phosphate. A portion of each lay in bags in the barn till October. At that time the mixtures were in excellent condition. There were no lumps which did not fall apart on emptying the bags.

ODORLESS MINERAL GUANO.

This material,—wholly distinct from “Odorless Phosphate,” which is a basic slag produced in the manufacture of steel—is offered by The Forest City Wood Ash Co., of Boston. It is the soft phosphate of Florida and claimed to be the “best fertilizer on the market.”

A sample 4499 received from T. J. Stroud, of Shaker Station, contained 20.52 per cent. of phosphoric acid, of which 1.79 per cent. was soluble in ammonium citrate and in that sense “available.”

At reasonable prices this material may be profitably used on soils which are known to be specially deficient in available phosphates and hence likely to be benefited by a heavy application of some phosphate which will furnish phosphoric acid to the crop year after year.

MURIATE OF POTASH.

This is at present the cheapest source of available potash in our market. It is quite constant in composition and is sold under guarantee of 50 per cent. actual potash, though some lots contain one per cent. less than this.

The retail price is at present from \$42.50 to \$45.00 per ton, making the cost of actual potash from 4.2 to 4.45 cents per pound.

4506. Was bought in N. Y. City by S. D. Woodruff & Sons, of Orange.

4512. Was bought by S. E. Curtiss, of Stratford.

The samples contained respectively 49.77 and 50.73 per cent. of potash. Both parties bought for *cash*, for \$41.60 and \$41 per ton, delivered in lots of several tons, but less than car lots, at their freight station.

The cost of actual potash was therefore 4.2 cents and 4.0 cents per pound respectively.

CANADA WOOD ASHES.

4465. Bought of J. F. Ellwood, Greens Farms, by D. W. Clark, Westville.

4475. Bought of Allison, Stroup & Frost, New York City, by J. E. Larmer, Norwalk.

4485. Bought of Monroe, Lalor & Co., Oswego, N. Y., by J. N. Barnes, Yalesville.

4515. Bought of Forest City Wood Ash Co., by T. J. Stroud, Shaker Station.

4523. Bought of A. L. Hartness, Detroit, Mich., by A. E. Plant & Co., Branford.

4538. Bought of Clinton Phelps, East Granby, by Edward Austin, Suffield.

ANALYSES.

	4465	4475	4485	4515	4523	4538
Phosphoric Acid.....	1.78	1.80	1.43	1.68	2.28	1.84
Potash soluble in water.....	4.45	5.59	3.40	3.95	7.40	4.27
Cost per ton.....	\$11.50	10.50	11.50	10.50	10.00	11.00

The analyses show the usual variations. **4523** has about the composition of domestic hard-wood ashes. **4485** and **4515** are of very poor quality.

4515. Was bought on guarantee of five per cent. of potash soluble in water, and the purchaser secured a rebate on the amount paid for them.

The potash in these samples of wood ashes costs from 5.2 to 14.8 cents per pound, and on the average 9.8 cents, if we assume that their value consists wholly in the potash and phosphoric

acid which they contain, and reckon the latter at 5 cents per pound.

The value of ashes, however, does not consist wholly in these two ingredients. There are soils on which the carbonate of lime of which the ashes should contain sixty to seventy per cent., is worth more than the potash itself.

Lime is not abundant in most of our Connecticut soils, and the continued use of saline fertilizers, like potash salts, depletes the soil supply of it. But a moderate quantity of carbonate of lime in the soil is necessary in order to get the full effect of nitrogenous fertilizers.

Instead of using "unleached" hard-wood ashes, which do not contain more than $3\frac{1}{2}$ to 4 per cent. of soluble potash, it will pay to use air-slacked lime with muriate of potash or cotton hull ashes.

FOR INSTANCE:

	Potash. lbs.	Phosphoric Acid. lbs.	Lime. lbs.	Costing.
One ton of No. 4515, Canada ashes, contains.....	79	34	672	\$10.50-\$11.50
322 lbs of Cotton hull Ashes, 4509, and 950 lbs. (23 bushels) of oyster shell lime, contain..	80	38	682	\$ 9.26
160 lbs. muriate of Potash, 225 lbs. dissolved bone black and 950 lbs oyster shell lime, con- tain	80	36	670	\$ 9.09

COTTON HULL ASHES.

In the table on page 12, the valuation is made by reckoning potash, soluble, reverted and insoluble phosphoric acid at $5\frac{1}{4}$, 6, $5\frac{1}{2}$, and 2 cents per pound respectively. The cost of water-soluble potash is calculated by subtracting the valuation of the phosphoric acid from the cost price and dividing the remainder by the number of pounds of potash contained in a ton.

All of the samples thus far examined this year, with one exception, have been of good quality. The cost per pound of potash has ranged from 4.5 to 6.6 cents per pound, and has averaged 5.4 cents. There is no better form of potash known for the tobacco crop. It is the general opinion of the best growers that the high grade sulphate of potash is not well adapted for tobacco, the

COTTON HULL ASHES.

Station No.	Sold by	Bought by	Per Cent. of				Dollars per Ton.		Cents per pound.
			Water-soluble Phosphate Acid.	Citrate-soluble Phosphate Acid.	Insoluble Phosphate Acid.	Potash soluble in water.	Cost per ton.	Valuation.	
4476	F. W. Brodie & Co., Memphis, Tenn.	T. Soule & Co., New Milford	.45	5.44	2.17	17.24	30.00	25.49	6.5
4477	Planters Cotton Seed and Crushing Association, Greenville, Miss.	T. Soule & Co., New Milford	.50	5.09	1.11	24.64	30.00	32.51	4.7
4500	W. W. Cooper, Suffield	G. A. Harman, Suffield	1.42	9.69	.44	24.89	40.00	38.68	5.5
4525	I. L. Spencer, Suffield	F. B. Hathaway, Windsor Locks	3.41	8.98	1.30	28.35	40.00	44.25	4.5
4526	I. L. Spencer, Suffield	E. S. Seymour, Windsor Locks	2.71	9.39	1.42	24.35	40.00	39.71	5.3
4539	Southern Mills	Edward Austin, Suffield	.58	9.44	.93	26.92	38.00	39.72	4.9
4540	Southern Mills	Edward Austin, Suffield	---	---	---	27.89	38.00	---	---
4561	G. A. Douglass, Thompsonville	C. D. Woodworth, Thompsonville	.80	7.82	.53	22.17	33.75	33.05	5.4
4568	D. L. Brockett, Suffield	C. H. Wells, Suffield	.91	8.21	.41	27.16	40.00	38.80	5.5
4571	J. C. Eddy, Simsbury	D. L. Brockett, Suffield	.77	8.00	.44	26.35	40.00	37.57	5.7
4572	Edmund Halliday, Suffield	D. L. Brockett, Suffield	1.01	6.53	.55	20.12	35.00	29.74	6.6

muriate as a rule cannot be used on smoking tobacco and the choice therefore lies between the double sulphate of potash and magnesia, and either wood ashes or cotton hull ashes. The latter kind of ashes are much more economical when from 100 to 150 or even 200 pounds of actual potash per acre are required annually.

Cotton hull ashes, at present prices, are worth the attention of fruit growers. One ton of cotton hull ashes will supply as much potash as five tons of unleached wood ashes of average quality and costs from \$10 to \$15 less. The quantity of lime however would be very much less in the cotton hull ashes than in the wood ashes.

High grade sulphate of potash, containing from 48 to 51 per cent. of actual potash and the double sulphate of potash and magnesia, often called "low-grade sulphate of potash," containing from 25 to 27 per cent. of potash, are also in our market though no samples have been analyzed during the present season.

The cost of potash per pound in these goods ranges from $5\frac{1}{4}$ to 6 cents per pound, being usually a trifle higher in the double sulphate than in the high grade sulphate.

SUMMARY.

1. Nitrogen is bought at the present time in Connecticut for about the following prices at retail.

In nitrate of soda.....	15 $\frac{1}{2}$	cents per pound.
In dried blood.....	14 $\frac{1}{2}$	" " "
In dried fish.....	13 $\frac{1}{2}$ -14 $\frac{1}{2}$	" " "
In cotton seed meal.....	9.9-13 $\frac{1}{2}$	" " "

The nitrogen of cotton seed meal is as readily available as that of most animal matter, fish, tankage, bone and the like.

2. So-called "available phosphoric acid" (*i. e.* soluble and reverted taken together) costs at present, $2\frac{1}{2}$ -3 cents less, per pound, in "dissolved rock phosphate" than in "dissolved bone black."

Soluble, (water-soluble) phosphoric acid is of equal value to crops whether obtained from rock or bone. Reverted (citrate-soluble) phosphoric acid probably works equally well, whatever its source may be. When mixed with nitrogenous animal or vegetable matters in suitable quantity, dissolved rock phosphate does not cake in the pile or in bags.

3. Muriate of potash is the cheapest source of potash which, in this form, costs from $4\frac{1}{4}$ to $4\frac{1}{2}$ cents per pound.

4. Canada ashes are so variable and commonly so poor in quality, that they cannot serve economically as a source of potash. Their fertilizing value however does not consist alone in the potash and phosphoric acid they contain, but somewhat depends on the carbonate of lime which is their chief ingredient.

5. Cotton hull ashes, this spring, have been of good quality and furnish potash for $5\frac{1}{2}$ cents a pound on the average. They are well worth the attention of orchardists as a substitute for Canada ashes.

POULTRY FOODS.

The following brands of Poultry Food were sent to this Station for examination by J. S. Adam, of Canaan :

4516. Bradley's Superior Meat Meal, stated to be made of beef, blood and bones. Made by the Bradley Fertilizer Co., Boston, Mass.

4517. Bowker's Animal Meal, stated to be made from fresh beef and fresh bones, which are dried and cooked by steam and then ground. Made by the Bowker Fertilizer Co., Boston, Mass.

4518. Breck's Poultry and Swine Meal. "In addition to the pure meat and bone we have combined in this preparation some of the most potent agents known for the production of eggs, not by stimulating but rather by preventing disease and promoting general good health," etc. Made by Joseph Breck & Sons, 47 N. Market St., Boston, Mass.

4519. C. A. Bartlett's O. K. Feed. Stated to be made of material daily collected from the city butcher markets and cooked while perfectly fresh. It is then pressed, dried by steam heat and ground fine. Made by C. A. Bartlett, Worcester, Mass.

4520. Smith & Romaine's Boiled Beef and Bone. Made by Smith & Romaine, 109 Murray St., N. Y. City.

The samples were purchased from the manufacturer with the exception of **4517**, which was bought of Ives & Peirce, Canaan, Conn.

ANALYSES.

	Bradley's.	Bowker's.	Breck's.	Bartlett's.	Smith & Romaine's.
	4516	4517	4518	4519	4520
Moisture	5.03	4.81	12.86	4.69	5.13
Fat	11.37	11.50	10.95	11.50	13.75
Proteine*	36.62	41.75	29.81	40.68	38.00
Other Volatile and Organic Matters	3.72	4.49	4.90	5.49	5.15
Phosphate of Lime†	36.89	30.82	25.50	31.23	33.38
Sand and Soil	1.76	2.32	1.25	.57	1.03
Other Mineral Matters	4.61	4.31	14.73	5.84	3.56
	100.00	100.00	100.00	100.00	100.00
*Containing Nitrogen	5.86	6.68	4.77	6.51	6.08
†Containing phosphoric acid	16.86	14.11	11.67	14.29	15.27

The "proteine" is calculated by multiplying the nitrogen found by the factor 6.25.

All the preparations appear to consist chiefly of meat and bone having about the composition of "bone tankage" which is used as a fertilizer.

They are quite alike in composition excepting that Breck's Poultry and Swine Meal contains less proteine and phosphate of lime than either of the others and correspondingly more moisture and mineral matters which consist in part of carbonate of lime.



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